

LPC# 1210500002 Marion County
Sandoval Zinc Co. - Sandoval
ILD 053 980 454
F/HRS

Ref 24

Expanded Site Inspection



Prepared by:
Office of Site Evaluation
Division of Remediation Management
Bureau of Land

EXPANDED SITE INSPECTION

For:

Sandoval Zinc Company
Box 263 Smelter Road Highway 51, Sandoval, Illinois
ILD 053 980 454

Prepared by:
Illinois Environmental Protection Agency
Bureau of Land
Office of Site Evaluation

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SECTION 1.0 INTRODUCTION

On May 8, 2009, the Illinois Environmental Protection Agency's (Illinois EPA) Office of Site Evaluation was tasked by the United States Environmental Protection Agency (U.S.EPA) to conduct a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Expanded Site Inspection at the Sandoval Zinc Company site located in Sandoval, Illinois. The site is in the southern $\frac{1}{2}$ of the southeast $\frac{1}{4}$ of the northeast $\frac{1}{4}$ of Section 17, Township 2 North, Range 1 East of the Third Principal Meridian, in Marion County. See Figure 1 and Figure 2 for the location of the site. The site is located at latitude 38.61307 and longitude -89.11065. The site is designated by the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) database as ILD 053 980 454.

The primary objective of an Expanded Site Inspection is to address critical hypotheses or assumptions that were not completely supported during the Site Inspection. The Expanded Site Inspection will gather information to fully establish background conditions, fill in data gaps, or establish attribution to site operations. At the conclusion of the Expanded Site Inspection, it will be determined whether the site qualifies for possible inclusion on the National Priorities List (NPL) or should be dropped from further Superfund consideration. Additionally, the Expanded Site Inspection supports removal and enforcement actions and collects data to support further Superfund or other response actions.

The Expanded Site Inspection is not intended to be a detailed extent of contamination or risk assessment. Efforts requiring intensive background investigation or specialized techniques are normally conducted during the next phase in the Superfund process after a site is placed on the NPL and becomes eligible for remedial funding. The Expanded Site Inspection is performed under the authority of the Comprehensive Environmental Response, Compensation and Liability

Act (CERCLA) commonly known as Superfund.

The Sandoval Zinc Company site was placed on CERCLIS on December 1, 1983 in response to concerns that past site activities may have resulted in soil and sediment contamination on the site and throughout the surrounding area. The Illinois EPA conducted a Preliminary Assessment in 1986, a Screening Site Inspection in 1988, and an Expanded Site Inspection in 1997. Currently the site is still abandoned and is being managed by the Illinois EPA Federal Sites Remediation Section.

In August of 2009, the Illinois EPA's Office of Site Evaluation (OSE) prepared and submitted a work plan for the Sandoval Zinc Company site to the Region V offices of the U.S.EPA. The sampling portion of the Expanded Site Inspection was conducted during the week of October 19-22, 2009. During the ESI, the Illinois EPA sampling team collected fifteen sediment, twenty-seven soil, and four slag/waste samples from the Sandoval Zinc facility and surrounding area. The 2009 ESI was conducted to help determine the levels of contamination present at the Sandoval Zinc facility as well as any receptors which could potentially be impacted by former activities at the site. These potential receptors include designated wetlands, environmental and aquatic wildlife and human receptors.

SECTION 2.0 SITE BACKGROUND

Section 2.1 Site Description

The Sandoval Zinc facility is located east of the City of Sandoval. The facility is located approximately 1440 feet (0.27 miles) east of U.S. Route 51 and 2240 feet (0.42 miles) south of U.S. Route 50 at the eastern end of Smelter Road (a.k.a. Mississippi Avenue). The site consists

of 14.16 acres of property located in the south half of the southeast quarter of the northeast quarter of Section 17, Township 2 North, Range 1 East, in Marion County, Illinois. The property is bounded to the east and south by open agriculture land, to the west by a vacant parcel of land containing various types of vegetation and trees and to the north by the CSX Railroad tracks. To the north of the railroad tracks is agricultural land, wetlands and property currently owned by the Village of Sandoval.

Surface water runoff routes are noticeable by the gullies and erosion patterns flowing from the site and near the boundaries of the property. Runoff from the site follows a radial type pattern due to the site being higher in elevation at its middle than at the perimeter.

There are two main drainage pathways from the site. The first is located to the west of the site property. This intermittent drainage way runs from north to south, located approximately 300 feet west of the western boundary of the site. Surface water from the western portion of the property flows to this intermittent drainage ditch. This drainage ditch then flows southwest for 0.7 miles to Prairie Creek. The surface water then continues along Prairie Creek for 13 miles until Prairie Creek intersects Lost Creek. The surface water then continues for two miles along Lost Creek. The 15 mile target distance limit ends in Lost Creek just north of Route 161.

Surface water flows from north to south from the northeast portion of the Sandoval Zinc property. Surface water from the property enters into the wetlands approximately 300 feet west of the northeast corner of the property then flows through the property (wetlands) and exits the southeast corner. The wetlands and surface water continues on a north to south route until the wetlands are 100 feet north of the south perimeter of the fenced property where it bends to the east. Approximately 250 feet east of this bend in the wetlands, the wetlands bend to the

southeast then exit the property 30 feet north of its southeast corner. Surface water runoff collects in low areas to the north and south of the site, but eventually flow to the wetlands to the east. The eastern drainage pathway is composed of designated wetlands. These wetlands drain into Prairie Creek. Prairie Creek is a perennial water way located approximately 2000 feet south of the southeastern corner of Sandoval Zinc flowing in a southwesterly direction. The wetlands empty into Prairie Creek at approximately 2000 feet from the southeastern corner. The surface water pathway continues for approximately 13 miles to Lost Creek. Once entering Lost Creek the surface water pathway continues for two miles to the terminus of the 15 mile target distance limit.

The Sandoval Zinc Company site can be accessed by vehicle via an asphalt and gravel road which runs east from U.S. Route 51 and through a locked but dilapidated gate at the southwest corner of the property. No buildings are present, only large concrete building foundations remain of the former facility. There is no activity and no caretaker or guards on the property. Although the property has been officially sealed by the Illinois EPA, including the construction of a perimeter fence, the property has on numerous occasions been accessed by local residents with visible signs of trespassing.

2.1.1 Site Geology

The property is located in an area of south central Illinois where surficial terrain has been shaped by various types of glacial deposition. The land surface has been modified by glacial activity into the relatively flat to gently rolling plains characteristic of glacial drift regions. The topography surrounding the site is relatively flat and lies at approximately 500 to 505 feet above mean sea level (MSL). An artificial mound of cinder/slag and other fill material has raised the elevation of the central portion of the site to approximately 510 feet MSL. The site surface slopes gently to the lower elevations on all sides, except to the east, where a rapid drop of about five feet occurs, down to the eastern drainage channel. East of this channel is an on-site pond. The pond was used by Sandoval Zinc as process water supply. Established vegetation ranging from grasses to mature trees is present around the pond with no visible evidence of stress to the vegetation.

Section 2.2 Site History

The Sandoval Zinc Company smelter facility began operating as a primary zinc smelter in 1898. On September 24, 1914, a fire destroyed the smelter. In 1915, the company began operating as a secondary zinc smelter. Compounds fed into the kilns were pure zinc, zinc oxide, zinc chloride, possibly aluminum chloride and other trace metals. The facility remained a secondary smelter until the facility was closed in 1985. In December of 1986, the Sandoval Zinc Company was officially dissolved and the owners declared bankruptcy.

The Sandoval Zinc Company property is currently owned by a private individual recorded on February 2, 2006. Prior to the current owner, the property was owned by the Marion

County Trustee. Prior to the Marion County Trustee, the site was owned by White Brothers Salvage and Recycling who received the title from Albert F. Haas per warranty deed. Albert F. Haas received the title for the property from a corporation deed from Sandoval Zinc Company executed on March 14, 1988.

During the first eighty-five years of operation, the principle waste emissions from the plant were metal laden cinder/slag and windblown ash. Large quantities of cinder/slag from the smelting process were used in constructing and surfacing secondary roads in the plant and as fill material on the property. Due to filling on the site, layers of cinder/slag range from one to ten feet thick over the twelve acres. Cinder/slag material that were unable to be utilized by the plant were placed into large piles on the property and offered to the public and the Village of Sandoval for use in constructing and surfacing roadways, driveways, sidewalks, and parking lots (Illinois EPA, BOL File, Interviews conducted by Ken Corkill). Many areas throughout the Village of Sandoval exhibit evidence of the use of cinder/slag. Probing adjacent to driveways and sidewalks reveal cinder/slag, some of which have since been covered with concrete.

The windblown ash was emitted from the smelter stacks for many years. This ash settled on the plant site and the surrounding community and farmland. Typically, ash from secondary zinc smelters using retort furnaces is high in concentrations of heavy metals. The volume of ash emitted from retort stacks averaged between 50 to 100 tons per year (Ebasco, p. 1-3). Additional sources of wind-borne emissions may have resulted from handling practices of plant waste products. This might have included open storage of waste cinder/slag and ash and bulk storage of products, mostly zinc oxide. The zinc oxide was stored inside plant buildings which would have reduced wind-borne emissions. In 1970, in compliance with air pollution regulations, a

stack scrubber was installed. Sandoval Zinc ceased operations in 1985.

Section 2.3 Previous Investigations

A CERCLA Preliminary Assessment was completed on December 19, 1986 with a higher priority rating. A CERCLA Site Inspection was completed on March 31, 1988. On April 24, 1991, a seal order was placed on the abandoned facility by the Illinois EPA. The Illinois EPA undertook removal actions in November 1991 in response to a spill of fuel oil from an above ground storage tank. In April 1993, Ebasco Environmental Inc. (Ebasco) completed a Draft Feasibility Study for the site (a Final Feasibility Study was never completed). Lead was found to be greater than 10,000 ppm. Elevated levels of copper, nickel, and zinc were also found at the site.

In September 1995, a second CERCLA Screening Site Inspection was completed with a high priority and a recommendation that the site continue in the CERCLA process. In May 1996 the Illinois EPA sent out enforcement 4(q) Notices to approximately 20 Potentially Responsible Parties (PRPs) for cleanup to be performed on the inside of the buildings. In April 1997, an additional fifty 4(q) Notices were sent to additional PRPs.

Additional cleanup activities performed in 1998 consisted of repairing and replacement of fencing, conducting a site inventory of the waste materials to be removed from the site including all readily quantifiable volumes of materials in drums or other containers and in spills on the ground. The following actions were also completed during the cleanup activities: the proper abandonment and sealing of monitoring wells; the removal and containerization of hazardous substances inside the buildings including zinc oxide waste and fuel oil contaminated soils; the removal and containerization of miscellaneous non-hazardous wastes including plastic

jugs and construction type debris; and the cleaning, demolition, and disposal of two above ground fuel oil storage tanks. Pressure washing, demolition and disposal of site buildings and materials were also completed. Currently, the site is owned by a private individual.

Section 2.4 Regulatory Status

Based upon the available file information, the Sandoval Zinc Company was at one time, subject to the Resource Conservation and Recovery Act (RCRA). On December 5, 2005, there was a RCRA Non Financial Records Review of the Sandoval Zinc site. On August 3, 1994, Sandoval Zinc notified the U.S.EPA as a Large Quantity Generator of hazardous waste. Due to Sandoval Zinc no longer being in operation, the Large Quantity Generator designation is no longer applicable. RCRA focuses only on active or future facilities and does not address abandoned or historical sites which are managed under CERCLA. Information currently available does not indicate that the site is under the authority of the Atomic Energy Act (AEA), Uranium Mine Tailings Action (UMTRCA), or the Federal Insecticide Fungicide or Rodenticide Act (FIFRA).

Sandoval Zinc Company has had numerous complaints registered against it, mainly due to its stack emissions. Attorneys representing an area farmer contacted Illinois EPA in 1987 alleging that the farmer had land and crops which were being impacted by contamination from the site. A June 1987 analysis by the Illinois Department of Agriculture of soybean plants from the subject field indicated healthy looking plants contained zinc at 260 ppm while dying plants contained zinc at 933 ppm. Analysis of water and sediment samples collected by Illinois EPA

personnel on March 30, 1987 from the west and east drainage ditches adjacent to the site revealed evidence that zinc and cadmium discharges had occurred over time. Levels found in the water samples exceeded surface water quality limits. Due to these exceedances, Sandoval Zinc Company was in violation of the ambient surface water quality limits set forth in Title 35, Subtitle C: Water Pollution, Section 304.124.

SECTION 3.0 EXPANDED SITE INSPECTION ACTIVITIES

Section 3.1 Sampling Activities

During the Expanded Site Inspection, all samples were collected in accordance with the Illinois EPA's Quality Assurance Project Plan (QAPP) and the Illinois EPA's Bureau of Land Sampling Procedures Guidance Manual. Soil and sediment samples were collected with stainless steel trowels or augers and put directly into sampling jars. All samples were analyzed by the federal contract laboratory program.

Section 3.1.1 Sediment Sampling

In October 2009, fifteen sediment samples were collected from the drainage area to the east of Sandoval Zinc in order to determine if contaminants may have migrated from Sandoval Zinc into the adjacent pond and wetlands. These samples were analyzed for the inorganic portion of the Target Compound List. All sediment samples were collected with a hand auger from the top six inches of sediment. The locations of the sediment samples are depicted in Figure 5 and the analytical results can be seen in Table 4. Sediment samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance

Manual (p. 10.6 – 10.7).

Section 3.1.2 Soil Sampling

Twenty-seven soil samples were collected from residential areas within Sandoval, located west of the Sandoval Zinc property. These samples were collected to help determine whether contamination from Sandoval Zinc has been utilized in the filling of low residential areas and as base for roads and sidewalks. These activities could pose a hazard to the residents.

The soil samples were collected with hand trowels and analyzed for the inorganic portion of the Target Compound List. All soil samples were collected within the top six inches of soil. The locations of the soil samples can be seen on Figure 3 and the complete analytical results can be seen in Table 2. Soil samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 6.7 – 6.8).

Section 3.1.3 Groundwater Sampling

Groundwater samples were not collected due to the Village of Sandoval receiving its drinking water from Centralia. Due to the absence of human consumption of groundwater from the surrounding area, the groundwater pathway was not evaluated.

Section 3.1.4 Waste Sampling

Four samples were collected from materials located on the Sandoval Zinc property. These four samples were collected near the four corners of the site property (Figure 4). These samples were collected to help determine the levels of contamination that exist on the Sandoval Zinc property that could potentially migrate to environmental receptors. These samples were

collected with hand trowels and were analyzed for the inorganic portion of the Target Compound List. The locations of the waste samples can be seen on Figure 4 and the analytical results can be reviewed in Table 3. Waste samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 5.7 – 5.8).

Two samples were collected for Toxicity Characteristic Leaching Procedure (TCLP), and the analytical results are presented in Table 5. These samples (T101 and T102) revealed barium, cadmium, selenium, and lead to be above the TCLP regulatory limits. Samples T101 and T102 were collected from the waste material located on the Sandoval Zinc Company site. TCLP samples were collected following the procedures described in the Bureau of Land Sampling Procedures Guidance Manual (p. 5.7 – 5.8).

SECTION 3.2 ANALYTICAL RESULTS

Section 3.2.1 Sediment Sample Results

Fifteen sediment samples were shipped to ChemTech Consulting Group located at 284 Sheffield Street in Mountainside, New Jersey for inorganic analysis. Sediment sample X214 and X215 were utilized as background samples due to the sample locations being up-gradient of the facility. All sediment samples were collected from 0 - 6 inches from similar media located in the drainage wetland area. Inorganic analysis revealed significantly elevated levels of antimony, cadmium, copper, lead, nickel and zinc. Refer to Table 1 for sediment sample descriptions and to Table 4 for the inorganic results for sediment samples.

Section 3.2.2 Soil Sample Results

Twenty-seven soil samples were shipped to ChemTech Consulting Group located at 284

Sheffield Street in Mountainside, New Jersey for inorganic analysis. All of the soil samples were collected from residential areas inside the municipal boundaries of Sandoval. These samples were collected to determine the impact of inorganic contaminants in the area. Soil sample media was similar in nature being brown silt to brown silty clay. All samples were collected within the 0 – 6 inches from the surface of the soil. Soil sample descriptions can be found in Table 1.

Soil samples X119 and X126 were collected from residential areas west of the facility and represent background conditions.

Upon comparison to background concentrations, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium and zinc exceeded three times the background levels for soil samples (Table 2).

Section 3.2.3 Waste Sample Results

Four waste samples were shipped to ChemTech Consulting Group located at 284 Sheffield Street in Mountainside, New Jersey for inorganic analysis. Inorganic analysis revealed elevated levels of antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, sodium, and zinc. Antimony, cadmium, copper, lead, nickel, and zinc significantly exceeded background concentrations in all four waste samples. Waste sample results can be viewed in Table 3.

TCLP results indicated that barium, cadmium, lead and selenium were found to be in excess of the maximum concentration of contaminants for the toxicity characteristic.

SECTION 4.0 SITE SOURCES

Section 4.1 Introduction

This section includes descriptions of the various hazardous waste sources that have been identified at the Sandoval Zinc Company site. The Hazard Ranking System defines a “source” as: “Any area where a hazardous substance has been stored, disposed or placed, plus those soils that have become contaminated from migration of hazardous substances.” This does not include surface water or sediments below surface water that have become contaminated.

Information obtained during the Expanded Site Inspection identified two separate source areas. These sources areas were identified as the waste pile located on the Sandoval Zinc property and the contaminated soil located along the overland flow route.

This section will briefly discuss the hazardous waste sources which have been identified through CERCLA site investigation process.

Section 4.2 Waste Pile

The entire fenced portion of the site could be classified as a waste pile as byproducts of the smelting operations. Over the years, cinder/slag and ash were deposited directly on the site ground surface. Cinder/slag material is estimated to be up to ten feet deep in some areas of the site. The practice of disposing of waste in this manner began with the opening of the plant in the late 1880s and ended in 1970 when a scrubber system was placed on the plant stack. Scrubber waste was subsequently placed into a dewatering lagoon (100 ft by 100 ft by 4 ft deep), constructed into the cinder/slag waste pile east of the plant buildings and allowed to dry. After dewatering, the sludge material was reprocessed or sold to fertilizer companies. The lagoon is

no longer visible and the specific location is not known.

During the 1997 CERCLA ESI sampling event, five soil samples were collected from various locations on the Sandoval Zinc Company property. Analysis of the collected samples indicated numerous contaminants above background concentrations with many being three or more times background concentrations. The contaminants which exceeded three times background in all four samples included antimony, arsenic, cadmium, copper, lead, nickel and zinc. Chromium (X301, X303, X304), mercury (X301, X302, X304), and selenium (X301, X302, X304) exceeded three times background concentrations of three of the four waste samples. Iron exceeded three times background concentrations in samples X301 and X304. Silver exceeded three times background concentrations in samples X301 and X302. Sodium and barium exceeded three times background concentrations for X301.

Groundwater sample analysis from the Ebasco Services Incorporated, April 1993 investigation revealed high concentrations of cadmium, chromium, copper and silver in groundwater adjacent to the site. The Illinois State Water Survey/Illinois State Geological Survey (ISWS/ISGS) investigation, *Retention of Zinc, Cadmium, Copper, and Lead by Geologic Materials* (conducted from 1975 to 1982) revealed zinc contamination up to 28 feet below ground surface (ISWS, p.37).

Samples collected from May and June of 1990 and from April 1991 by Ebasco indicated aluminum, calcium, copper, iron, lead and zinc were found in high concentrations in most of the samples.

During the 1997 Expanded Site Inspection, five samples were collected from the Sandoval Zinc property. These samples along with the samples collected by Ebasco and the

ISGS were utilized in determining the source area and to determine soil contaminant concentrations. Based on these samples, the source area is approximately 566,280 square feet (1997 ESI, p. 15).

Four samples were collected from the waste pile located onsite during the 2009 ESI. These samples revealed elevated levels of antimony, arsenic, barium, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, sodium, and zinc. Antimony, cadmium, copper, lead, nickel, and zinc significantly exceeded background concentrations in all four waste samples. X119 and X126 were chosen as representative background concentrations of inorganics. X119 and X126 are located outside of the influence from windborne emissions from the former Sandoval Zinc Company. These background locations were also chosen due to the absence of cinder/slag waste material. Waste sample results can be viewed in Table 3. All of the samples utilized for source determination were taken in the upper two feet of soil, in runoff areas and areas which were used to dispose of ash and cinder/slag wastes attributable to former site activities. Based on the results from the waste samples, the waste pile source is an area of approximately (238,021 square feet). This is based on calculations from ArcMap. It should also be noted that the concrete building pads have been subtracted out of the final area of the waste pile.

Section 4.3 Contaminated Soil (Overland Route)

During sampling activities conducted in 1996, one soil sample was collected from the west bank of the pond east of the Sandoval Zinc property. Sample analysis indicated several contaminants were above background concentrations and similar in nature to those detected in the contaminated soil on Sandoval Zinc property. The radial nature of site drainage has provided

the mechanism by which contaminants have migrated from the property boundaries resulting in an additional area of contaminated soil. Even though the investigations of the Sandoval Zinc Company site have determined that there is contamination outside of the facility boundaries, the full extent of soil contamination has not been determined. Based on the analysis of soil samples collected at the Sandoval Zinc Company property and beyond, the current area of contaminated soil is estimated to be 425,000 cubic yards (Ebasco, p. 6-3). The purpose of the sampling beyond the property boundary was to determine if runoff from the property had affected the area surrounding the property.

Section 4.4 Contaminated Soil (Residential Yards)

Residential soil samples collected from within the Village limits of Sandoval indicated that contamination attributable to the processes at the former Sandoval Zinc Company is present. There were 16 residential yards which have been found to contain elevated levels of lead. U.S.EPA has not established a level one benchmark for lead in residential soils. It is assumed that residents in the area utilized the cinder/slag material from Sandoval Zinc as fill in residential neighborhoods. Unused cinder/slag material was also used for road and sidewalk base. Due to the random distribution of the cinder/slag material in Sandoval, it is difficult to assess the amount of contamination present, and each residential yard should be considered a separate source.

SECTION 5.0 OTHER POSSIBLE SOURCES

Section 5.1 Former Zinc Oxide Pile

The subject waste piles were located inside the buildings on the property. These piles were composed of mainly zinc oxide. These piles have been sampled during previous

investigations with analytical data recorded in April 14, 1989 and April 7, 1993 reports. The piles were found to contain elevated concentrations, above remediation objectives, of aluminum, iron, lead and zinc. Copper and nickel were also found to be above remediation objectives in one of the locations (71,000 and 14,000 ppm respectively). Lead ranged from 1,100 to 63,000 ppm and zinc ranged from 27,000 to 680,000 ppm. These piles have been removed from the property.

SECTION 6.0 MIGRATION PATHWAYS

Section 6.1 Introduction

CERCLA identifies three migration pathways and one exposure pathway by which hazardous substances may pose a threat to human health and/or the environment. Consequently, sites are evaluated on their known or potential impact to these four pathways. The pathways evaluated are groundwater migration, surface water migration, air migration and soil exposure. The following section discusses these pathways and the site's impact or potential impact on them and on the various human and environmental targets. These targets include human populations, fisheries, wetlands and other sensitive environments.

Section 6.2 Groundwater Pathway

According to the Illinois State Geological Survey and the Illinois State Water Survey the Sandoval Zinc Company site is located in the south central portion of the Illinois Basin. This is a large Paleozoic spoon shaped sedimentary basin. Surficial deposits overlaying the bedrock strata of the basin are unconsolidated glacial tills, outwash, and drift. The thickness and composition of these deposits vary across the state, typically thinning to the south.

The glacial deposits of south central Illinois are composed primarily of till, poorly sorted clay, silt, sand and pebbles laid down during the four major Pleistocene advances of the glaciers (Nebraskan, Kansan, Illinoisan and Wisconsinan advances).

The subsurface geology at the Sandoval Zinc Company site was investigated through soil borings during previous site investigations conducted by Ebasco and Illinois EPA. The generalized stratigraphy at the site, beneath the cinder/slag fill, consists of glacial deposits of varying thickness overlying the Pennsylvanian Bond Shale. Based on the previously mentioned soil borings, the glacial deposits consisting of Peoria Loess and Roxana Silt of the Wisconsinan Stage; the Berry Clay of the Sangamonian Stage; the Hagarstown Member and the Glasford Till of the Illinoisan Stage were found to depths of approximately 20 feet below ground surface. The Peoria Loess is brownish-gray clayey silt with small amounts of sand that was formed by wind deposits of fine particulate matter. The loess ranges in thickness from 6 to 12 feet throughout the Sandoval Zinc Company site. Below the Peoria Loess is the Roxana Silt, this is a dark brown clayey silt with approximately 30 percent sand content. The Roxana Silt is thin beneath the site ranging in thickness from 1 to 2 feet. The Berry Clay, below the Roxana Silt, is dark gray in color and is a sandy, silty clay with some small gravel. The Hagarstown Member of the Illinoisan Stage, below the Berry Clay is a thin silty sand approximately 1 to 2 feet in thickness. At times this strata is difficult to distinguish from the underlying till. This unit is the only one which is water-bearing in the vicinity of the site. The Glasford Till, below the Hagarstown Member, consists of gray to dark gray sandy and silty till which is approximately 20 to 40 feet thick throughout the area beneath the site. Small lenses of sand, silt, and clay can also be found within the till.

Previous investigations by the ISWS/ISGS determined the glacial deposits below the Glasford Till to be the Lierle Clay and the Banner Formation Till. Underlying the Banner Till, at depths of 55 to 75 feet below ground surface is the Pennsylvanian Bond Formation which is a micaceous green shale. The Ebasco and Illinois EPA borings were finished at shallower depths than those of the ISWS/ISGS study, and were also located at the edge of the facility, where the artificial fill material was not encountered.

Much of the regional groundwater in Marion County, particularly in the western portion of the county, is retrieved from the unconsolidated glacial deposits that cover the Pennsylvanian bedrock. In some areas, Pennsylvanian sandstones are a source of groundwater, mostly in the southwestern portion of the county. Where sandstone units occur, groundwater can be drawn from the top 150 to 200 feet of the units (ISGS, 1957). A pre-glacial valley in the west-central part of Marion County has thick deposits of unconsolidated sands and gravels. These deposits are a source of limited private water supplies. Most of the local water supply for the farms and residences surrounding the Village of Sandoval is obtained from large diameter wells completed in the unconsolidated deposits of the Hagarstown Member. These wells, which were either dug or bored, usually tap lenses or thin layers of water-bearing silty sand or gravel only a few inches thick (ISGS, 1980). The wells range in depth from 30 to 60 feet with water levels varying up to 10 feet due to seasonal precipitation and recharge rates. These wells may only produce a few hundred gallons of water per day. There is no potential for providing enough water for a municipal supply. According to the Illinois EPA's Bureau of Water surface water assessment program, there are no known drinking water wells within 4 miles of the Sandoval Zinc property. Test holes drilled into the Pennsylvanian Bond Shale have encountered only a few thin beds of

water-bearing sandstone and creviced limestone. Below depths of 100 to 150 feet beneath ground surface, water is potentially too mineralized to be used for domestic purposes.

Conversations with the Sandoval Municipal Water Supply have revealed that all individuals in the area are supplied with a public water supply.

The Village of Sandoval, with a population of approximately 1535 persons, is supplied with drinking water by the community of Centralia, which obtains source water from Carlyle Lake and Raccoon Lake. Carlyle Lake is located northwest of the site and Raccoon Lake is located south of the site. Neither of these lakes is connected by overland flow to Prairie Creek nor any runoff from the Sandoval Zinc Company site.

Groundwater beneath the site and around its perimeter has been contacted at between five and eight feet below ground surface. Depth of soil and groundwater contamination is based on previous site studies completed by ISWS/ISGS, Ebasco and Illinois EPA. Inorganic analyte contamination to approximately 28 feet below ground surface was found through soil coring and groundwater well samples completed and collected by ISWS/ISGS. Similar contaminants were found in groundwater beneath the site by Ebasco and Illinois EPA. These groundwater monitoring wells did not extend below 20 feet below ground surface.

Based on the cinder/slag fill covering the site to depths of 10 feet and groundwater being present at between four and eight feet beneath ground surface, groundwater therefore is in contact with fill material and contaminated soil. Volatile, semi-volatile, pesticide and PCB constituents were not found in these monitoring wells. No wellhead protection areas (as designated by Section 1428 of the Safe Water Drinking Act) exist near the site.

A table presenting the number of persons utilizing the Village of Sandoval public water

system in each distance category is presented below:

Distance (Miles)	Residents on Public Water
On-Site	18
0-1/4	445
1/4-1/2	630
1/2-1	414
1-2	348
2-3	1636
3-4	971

Section 6.3 Surface Water Pathway

Surface water drainage from the site is in a radial pattern with two prominent paths being toward the east and west. Moisture on the site has also been found to either infiltrate into the cinder/slag fill or pool at various locations. Drainage from the site flows into two intermittent streams which border the site, one on the east and one on the west. Due to this situation there are two Probable Points of Entry (PPE) to the surface water from the site.

The PPE for the eastern drainage pathway is located at the northeast corner of the site. Surface water from the north side of the site enters into the designated wetlands. According to National Wetland Inventory Maps, Palustrine Emergent, seasonally flooded wetlands exist along both sides of the entire distance of the intermittent drainage way from the Sandoval Zinc Company site to Prairie Creek. This type of wetland and a palustrine scrub-shrub wetland then continues southwesterly along both banks of Prairie Creek for another 3700 feet.

The drainage pathway for the western portion of the site flows into an area of dense phragmites (common reed) and to the western drainage ditch. The initial perennial waterway for the western drainage way is located 3500 feet south-southwest of the site at the confluence of the drainage way and Prairie Creek. There are no known wetlands designated in the western drainage ditch leading to Prairie Creek.

The 15-mile target distance limit for the eastern drainage way extends from the PPE at the contiguous wetlands adjacent to Prairie Creek for approximately thirteen and one half miles southwest to Lost Creek, ending one and one half miles southwest of the confluence of Prairie Creek and Lost Creek.

The 15-mile target distance limit for the western drainage way extends from the PPE at

Prairie Creek approximately twelve and one half miles southwest to Lost Creek, ending two and one half miles southwest of the confluence of Prairie and Lost Creek.

The closest permanent water body to the site is a small pond located on Sandoval Zinc property about fifty feet east of the eastern drainage way. This pond is an excavated palustrine unconsolidated bottom which is intermittently exposed wetland as indicated on the National Wetlands Inventory Map. Additional wetland type plants were noted, during the site reconnaissance and sampling event, in the drainage area north of the railroad tracks north of the Sandoval Zinc Company plant.

Section 6.4 Soil Exposure Pathway

The facility is no longer active and there is a partial fence surrounding the site. The perimeter fence was constructed a number of years ago, and it has repeatedly been vandalized and breached. There are numerous signs of recreational use on the property. With portions of the fencing down, tire tracks found onsite indicated that trespassers were riding dirt bikes, three and four wheeler vehicles and pickup trucks. There has also been evidence of fires on site.

The area immediately surrounding the Sandoval Zinc facility is considered to be a rural setting. There are no residents living on or within 200 feet of the site. Urban residential areas are located northwest, west and southwest of the former facility. Scattered rural residences are located throughout the four mile radius from the site. An estimated 1500 people live within one mile of the facility. The nearest resident is approximately 500 feet to the west of the facility. There are no schools or daycare facilities within 200 feet of documented soil contamination. The area to the north of Sandoval Zinc is currently open field.

Due to Sandoval Zinc being in operation for many years, the potential exists that through

the course of operations, contaminants such as lead and zinc may have been transported by various means throughout the Village of Sandoval. Because blood lead levels in children are a major concern, the Marion County Health Department was requested by the Illinois EPA to conduct a lead screening. On August 23, 1996, the Marion County Health Department conducted a special lead screening in Sandoval. Thirty-three children were tested, but none of the children tested exhibited a lead level of 10 ppb or above. The current standard for blood lead levels in young children and pregnant women is 10 micrograms per deciliter (g/dL) of whole blood (<http://www.cdc.gov/nceh/lead/publications/PrevLeadPoisoning.pdf>, 3/25/2010).

Soil samples were collected during the 2009 ESI from residential yards located within the municipal boundaries of the Village of Sandoval. Sixteen of the residences sampled revealed elevated levels of lead and zinc which can be attributed to the Sandoval Zinc operations. Five residential yards exhibited elevated levels of arsenic and four residential yards exhibited elevated levels of antimony, above the reference doses distinguished in the *Superfund Chemical Data Matrix*. These soil samples suggest that cinder/slag material from the site has been transported throughout the community for road and sidewalk base as well as residential yard fill material. Each of these residential yards is considered a source.

Section 6.5 Air Route

Past aerial photography of the site has shown smoke plumes being emitted from the stacks on the former retort furnaces and from the process building after use of the retorts were discontinued. Assuming the plant was typical of secondary zinc smelters using the retort processing, metal rich air emissions potentially reached a range from 50 to 100 tons annually (Illinois EPA, 1991, Konzelmann). Prior to the installation of a stack scrubber on the smelter

furnace, windblown ash, rich in zinc and other heavy metals, was deposited on the plant site, on the surrounding farm ground and in the Village of Sandoval. In addition to ash from the smelter furnaces, other windborne emissions may have been generated by plant waste handling procedures such as open storage of cinder/slag and ash as well as bulk storage of zinc oxide in open bins inside plant buildings. The potential for contaminated particulates to be carried off-site remains high as no mitigative measures have been implemented. Even though the facility has been inactive since 1985 with a fence constructed around the estimated extent of the cinder/slag fill, the property has been used by area residents as a venue for off road vehicle use. This is evidenced by their continued effort to tear down the fence and the numerous tire tracks throughout the site. Inhalation and ingestion are of concern due to these activities. An estimated 4,500 people live within a four-mile radius of the site. No schools or daycare facilities are located within 200 feet of observed soil contamination.

Population Table

Distance (in miles)	Population
0-0.25	18
0.25-0.50	445
0.50-0.75	630
0.75-1	414
1-2	348
2-3	1636
3-4	971

This data was accessed from the US Census data. Data from the US Census was used in an Arcview file and placed on a map. The Arcview program was then used to construct rings around the site. Population data points

were then sorted out for each ring.

SECTION 7.0 SUMMARY

The purpose of the Expanded Site Inspection was to determine if contamination still existed at the Sandoval Zinc facility and to determine if remediation objectives were being pursued. Upon completion of the ESI, it was determined that contamination still exists at the property and that the contamination is still impacting the wetlands and the creek to the east and south of the site. Remediation activities at the facility are not being completed nor are they currently being pursued.

In the past, Resource Conservation and Recovery Act (RCRA) personnel were conducting inspections of the site and attempting to regulate the activities at the facility. Due to bankruptcy proceedings, Sandoval Zinc is no longer being addressed through the RCRA program. Since the RCRA program is no longer applicable, Sandoval Zinc was unarchived from CERCLIS.

The Illinois EPA has discussed options on how to address the contamination of the site. Upon completion of these discussions it was suggested that the site continue in the CERCLA process.

Inorganic contaminants from past processes have been found in the surface water pathway. Contaminants have migrated from the site to the adjacent surface water body and wetlands. Wetlands are located along the drainage pathway and Prairie Creek for approximately 1.1 miles (National Wetlands Inventory Map) from the probable point of entry. Inorganic levels exceed three times the background concentration for antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, manganese, nickel and zinc (Table 4).

The groundwater pathway remains a concern. Drinking water for the City of Sandoval is supplied by the city of Centralia. Centralia obtains drinking water from surface water intakes located in Carlyle Lake and Raccoon Lake. Information collected by the Illinois EPA's Source Water Assessment Program (SWAP) ArcIMS Mapping Tool did not show any evidence of private drinking wells. Although there are no documented wells, there is a possibility of rural residents still utilizing private drinking water wells, which could be contaminated by past processes at the Sandoval Zinc Company site.

In the past, windborne contamination from the site may have been emitted from the smoke stacks associated with the operations at the Sandoval Zinc Company site. Contamination may have potentially been blown into the surrounding areas. Possible human exposure to airborne materials has not been documented.

Although the site is fenced, areas of the fence have been trampled or driven over, thus the fence is not a deterrent to trespassing. Evidence of trespassing has been documented with various pictures of vehicle tracks. Soil exposure to these individuals is a possibility. Also of a concern is the practice of all terrain vehicles stirring up the cinder/slag material and dust. This would enhance the possibility of individuals inhaling hazardous material.

Soil samples collected in residential yards within the Village of Sandoval revealed elevated levels of inorganics which can be attributed to the site. Discussions with local residents suggests that cinder/slag have been transported by individuals and utilized for road and sidewalk base as well as fill material for low areas throughout the community. Human exposure to these contaminants is possible in these areas around the City of Sandoval.

SECTION 8.0 REFERENCES

- 1 Illinois Environmental Protection Agency,
http://163.191.83.31/dww/JSP/WaterSystemDetail.jsp?tinwsys_is_number=717390&tinwsys_st_code=IL&wsnumber=IL1214220. 12/15/2009.
- 2 Illinois Environmental Protection Agency, Bureau of Land Files, Sandoval Zinc, LPC 1210500002.
- 3 Gibb, James P., and Keros Cartwright, Illinois Department of Natural Resources, Illinois State Geological Survey, Retention of Zinc, Cadmium, Copper and Lead by Geologic Materials, 1982. p.113.
- 4 United States Department of the Interior, National Wetlands Inventory Map of the Centralia East Quadrangle, 1987.
- 5 United States Department of the Interior Geological Survey, Topographical Map of the Centralia East Quadrangle, .
- 6 United States Department of Agriculture, Soil Survey of Marion County, Illinois. 1999.
- 7 Ebasco Environmental Inc., Sandoval Zinc Feasibility Study, April 7, 1993.
- 8 Illinois EPA. RCRA Inspection Report for Sandoval Zinc. December 5, 2005. 7 pages.
- 9 USEPA. Notification of Regulated Waste Activity for Sandoval Zinc Company. July 25, 1994. 2 pages.
- 10 Illinois EPA. Interviews with Ken Corkill from Sandoval Residents. Undated.
- 11 Illinois Department of Public Health. Public Health Assessment from Sandoval Zinc Company, Sandoval, Marion County, Illinois. 13 pages.
<http://www.atsdr.cdc.gov/hac/pha/pha.asp?docid=602&pg=1>
- 12 <http://www.cdc.gov/nceh/lead/publications/PrevLeadPoisoning.pdf>, 3/25/2010.

Appendix A

Figures

Figure 1

Site Location Map

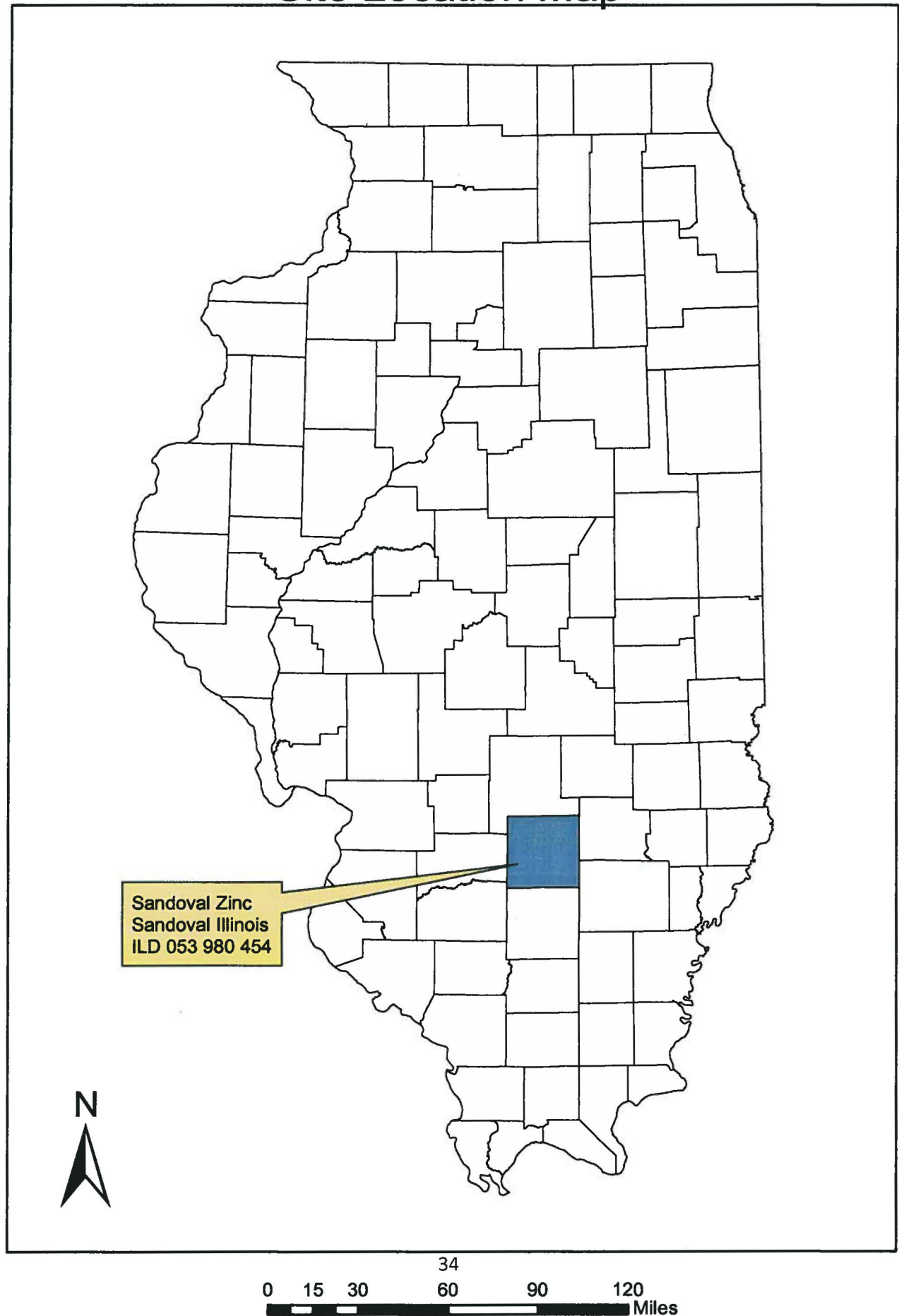


Figure 2
Site Area Map

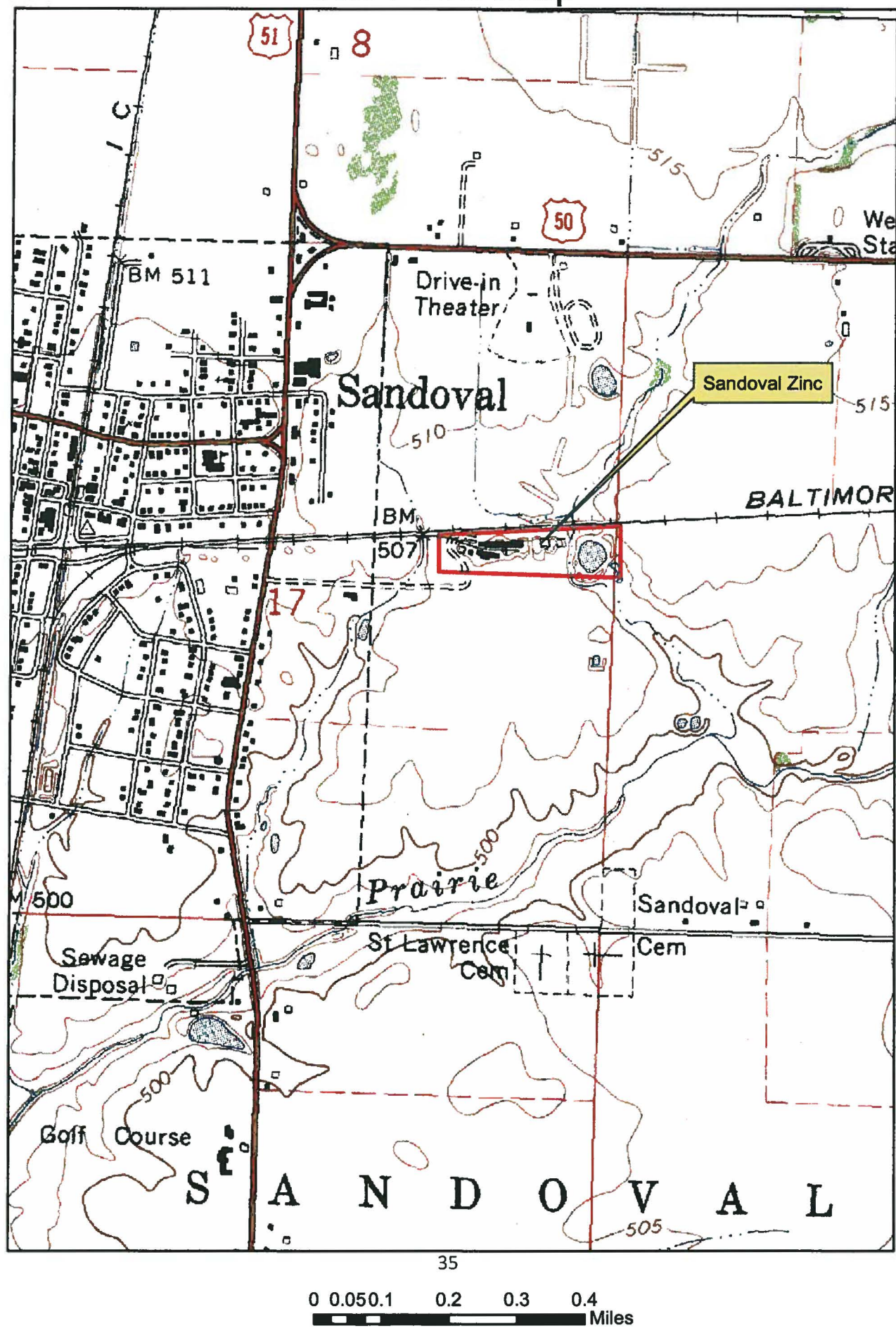


Figure 3
Soil Sample Map

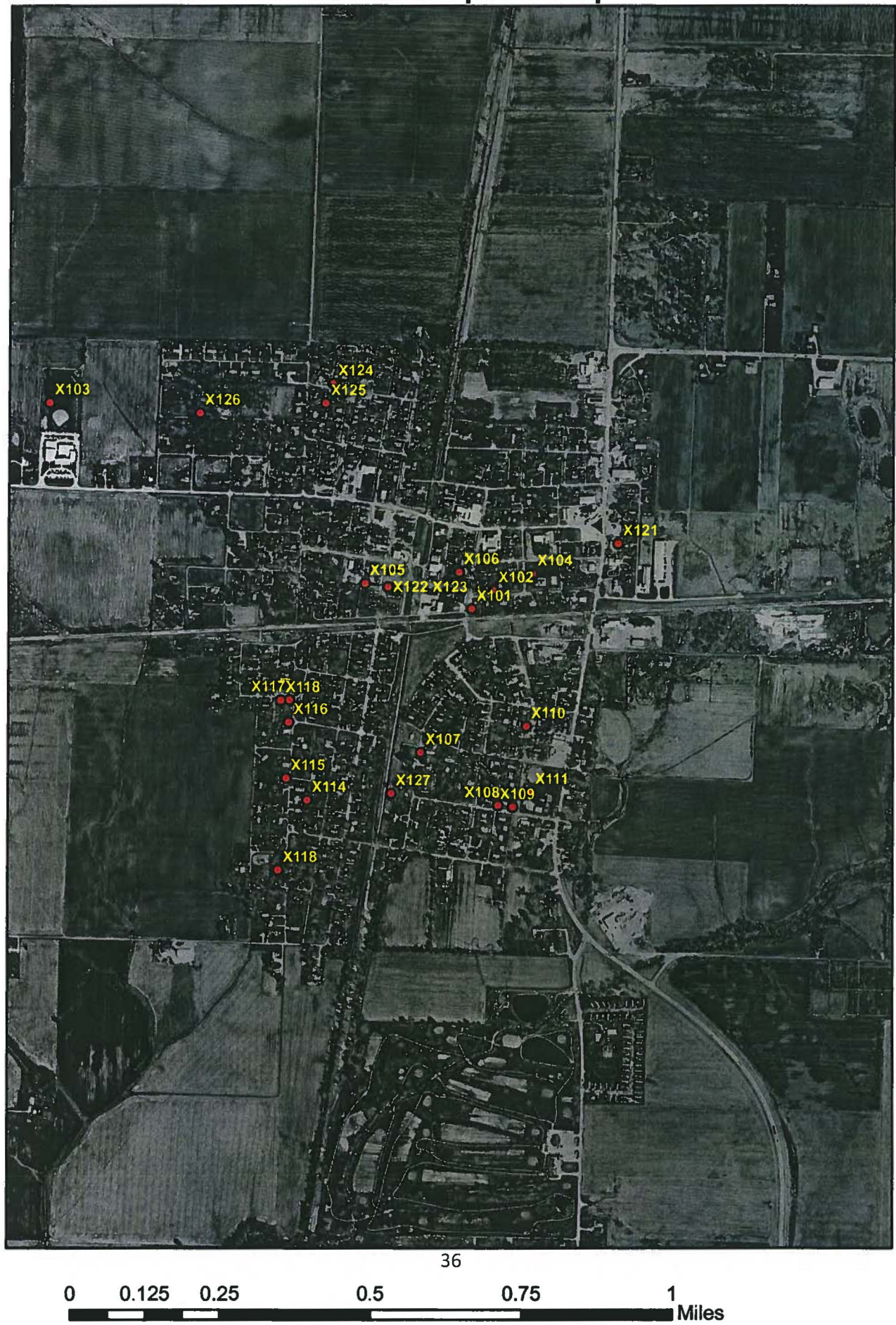


Figure 4
Waste Sample Location Map



37

0 0.03 0.06 0.12 0.18 0.24 Miles



Figure 5
Sediment Sample Location Map



Figure 6
Wetlands along the 15 Mile TDL



0 0.3 0.6 1.2 1.8 2.4
Miles



Figure 7
15 Mile Target Distance Limit

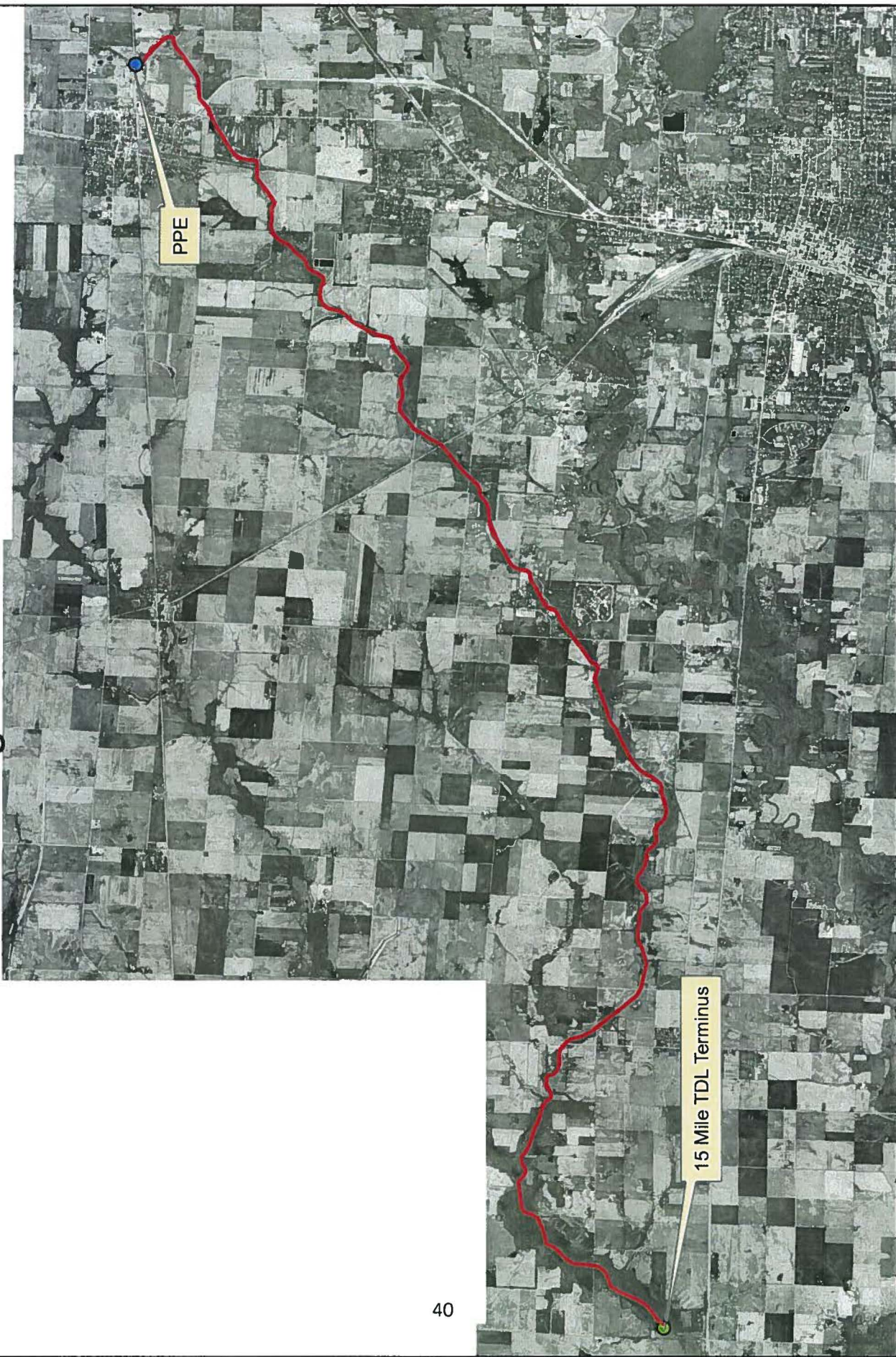
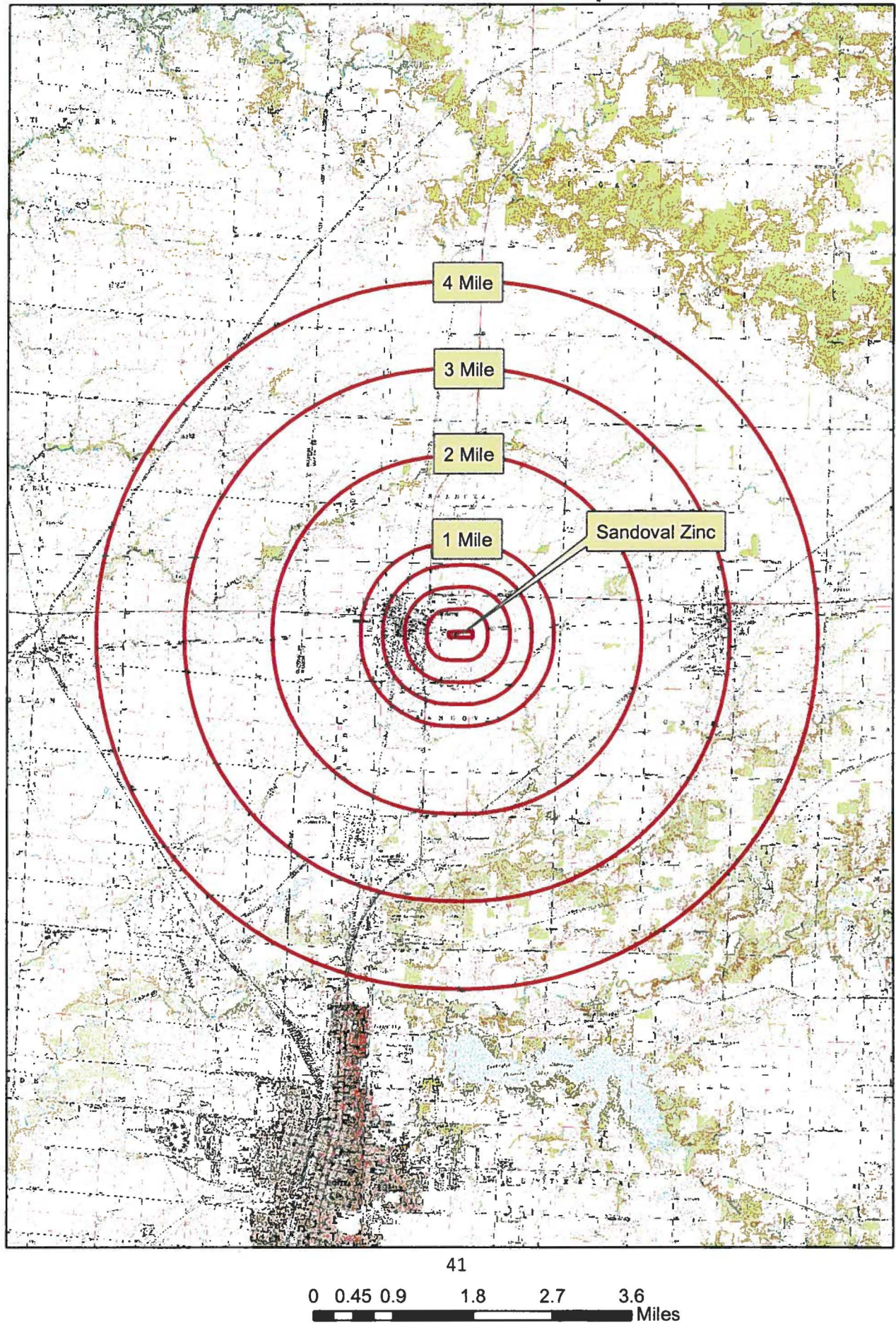


Figure 8
4 Mile Radius Map



Appendix B

Tables

TABLE 1
Sample Descriptions

Sample	Location	Depth	Description
X201	X201 was collected at the confluence from several ditches where they meet Prairie Creek.	0-3 inches	X201 consisted of a brown sediment which consisted mostly of silt.
X202	X202 was collected in the wetlands in the southern area where the ditch splits into a delta like pattern.	6-8 inches	X202 consisted of a brown sediment which consisted mostly of silt.
X203	X203 was collected from the approximate middle (width) of the wetland near the southern end of the wetland.	6-8 inches	X203 consisted of a mostly clayey silt with some grit which was brown in color.
X204	X204 was collected from the approximate middle of the wetlands.	12-16 inches	X204 was collected from a sandy silt with some clay which was brown in color.
X205 (dup)	X205 was collected from the approximate middle of the wetlands.	12-16 inches	X205 was collected from a sandy silt with some clay which was brown in color. X205 was a duplicate of X204.
X206	X206 was taken from the ditch running through the wetlands near the fourwheeler trail, just before the ditch turns south.	8-10 inches	X206 consisted of a brown silt with very little grit.
X207	X207 was collected from the east side of the fourwheeler path through the wetland.	4-6 inches	X207 consisted of a brown silt with very little grit.
X208	X208 was collected from the wetland area near where the old fence line runs through the wetland.	6-8 inches	X208 was collected from a silty sand.
X209	X209 was collected from the wetland area to the south of the pond.	10-12 inches	X209 consisted of a brown gritty silt.
X210	X210 was collected from the inlet/outlet on the west side of the pond.	0-4 inches	X210 was collected from a brown silt with gritty gravel.
X211	X211 was collected from the confluence of the runoff ditch from the site to the wetlands. This confluence is located between the fenced portion of the site and the pond.	0-3 inches	X211 consisted of a brown silt with gritty material (cinders).
X212	X212 was collected from the northeast corner of the site there the confluence of surface water which runs along the northern edge of the site intersects the wetlands.	0-3 inches	X212 consisted of a gritty brown silt.
X213	X213 was collected from north of the tracks in the phragmites. This area has surface water flowing from the west out of the phragmites.	0-3 inches	X213 consisted of a light brown silt with some grit. This sample may have been influenced by fallout from the stacks from former operations at the Sandoval Zinc facility.

TABLE 1
Sample Descriptions

Sample	Location	Depth	Description
X214	X214 was collected north of the site in an area which appears to be unimpacted by site operations.	0-4 inches	X214 consisted of a silty brown clay.
X215	X215 was collected further north than X214 in an area which appears to be unimpacted by site operations	0-3 inches	X215 consisted of a brown silt.
X101	X101 was collected from the southwest corner of a residential property within Sandoval	2-4 inches	X101 consisted of a black cindery material.
X102	X102 was collected from the southwest corner of a residential property within Sandoval	2-4 inches	X102 consisted of a sandy brown loam.
X103	X103 was collected from a municipal area within Sandoval	2-4 inches	X103 consisted of a brown loam which was located just under a peat type layer.
X104	X104 was collected from a municipal area within Sandoval	4-6 inches	X104 consisted of a brown loam with fill material (glass and cinders).
X105	X105 was collected from a residential area within Sandoval, Northeast of the watertower.	4-6 inches	X105 consisted of a brown silty loam interspersed with gravelly fill material.
X106	X106 was collected from a residential property located within Sandoval. X106 was collected from the southwest portion of the property.	4-6 inches	X106 consisted of a dark brown silty loam with some grit.
X107	X107 was collected from a residential property within Sandoval.	4-6 inches	X107 consisted of a brown silty cindery mix
X108	X108 was collected from a residential property located within Sandoval	4-6 inches	X108 was collected from a brown loam with cindery material.
X109	X109 was collected from a residential property located within Sandoval.	4-6 inches	X109 was collected from a light brown silty loam.
X110	X110 was collected from a residential property located within Sandoval.	4-6 inches	X110 was collected from a brown silty loam.
X111	X111 was collected from a residential property within Sandoval	4-6 inches	X111 was collected from a silty brown loam.
X112	X112 was collected from a front yard from a residential property within Sandoval.	4-6 inches	X112 was collected from a brown silty loam with some cinders.

TABLE 1
Sample Descriptions

Sample	Location	Depth	Description
X113	X113 was collected from a front yard of a residential property within Sandoval.	4-6 inches	X113 consisted of a brown clay silt with cinders.
X114	X114 was collected from the eastern edge of a residential property located in Sandoval.	0-4 inches	X114 consisted of a brown clay.
X115	X115 was collected from a front yard of a residential property located in Sandoval.	0-2 inches	X115 consisted of a brown silty clay.
X116	X116 was collected from the northeast corner of a residential property located in Sandoval.	4-6 inches	X116 consisted of a brown silty clay.
X117	X117 was collected from a residential property located within Sandoval.	0-2 inches	X117 consisted of a brown silty clay with cinders.
X118	X118 was collected from a residential property located within Sandoval.	4-6 inches	X118 was collected from a reddish brown cindery mix.
X119	X119 was collected from a residential property within Sandoval.	4-6 inches	X119 was collected from a brown silty clay.
X120	X120 was a duplicate of X119.	4-6 inches	X120 (dup) was collected from a brown silty clay.
X121	X121 was collected from a privately owned area in Sandoval.	2-4 inches	X121 was collected from from a brown silt with some clay.
X122	X122 was collected from a privately owned property within Sandoval.	4-6 inches	X122 was collected from a brown cindery fill mix.
X123	X123 (dup of X122) was collected from a privately owned property within Sandoval.	4-6 inches	X123 was collected from a brown cindery fill mix.
X124	X124 was collected from a residential property within Sandoval.	0-2 inches	X124 was collected from a brown silty clay mix.
X125	X125 was collected from a residential property within Sandoval.	0-2 inches	X125 consisted of a brown cindery silty clay.
X126	X126 was collected from a residential property within Sandoval.	0-2 inches	X126 consisted of a dark brown silty clay.
X127	X127 was collected from a residential property within Sandoval.	4-6 inches	X127 consisted of a brown silty clay.
X301	X301 was collected from inside the fenced property known as Sandoval Zinc. This sample was collected slightly northeast of the entrance gate on the west side of the property.	0-4 inches	X301 consisted of a slightly gray material intermixed with rocks. Sampled material appears to be zinc oxide.

TABLE 1
Sample Descriptions

Sample	Location	Depth	Description
X302	X302 was collected near the southeast corner of the fenced portion of Sandoval Zinc.	0-4 inch	X302 consisted of a dark gray sandy silt material.
X303	X303 was collected from the northeast corner of the fenced portion of Sandoval Zinc. This sample was located just to the north of the former furnace.	0-4 inches	X303 consisted of a black cindery material.
X304	X304 was collected from the northwest area of the fenced portion of Sandoval Zinc.	0-4 inches	X304 consisted of a reddish brown sandy material.
T101	T101 was collected near the southeast corner of the fenced portion of Sandoval Zinc. Same location as X302.	0-4 inches	T101 consisted of a dark gray sandy silt material.
T102	T102 was collected from the northwest area of the fenced portion of Sandoval Zinc. T102 was collected from the same location as X304.		T102 consisted of a reddish brown sandy material.

Table 2
Soil Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9			ME00T2		ME00T3		ME00T4		ME00T5	
Sampling Location :	X119		X120		X126			X101		X102		X103		X104	
Matrix :	Soil		Soil		Soil		3 times	Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg		background	mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/20/2009		10/20/2009		10/20/2009		10/20/2009	
Time Sampled :			dup of X119												
%Solids :	75.3		75.5		76.4			79.3		77.6		73.4		73.6	
Dilution Factor :	1		1		1			1		1		1		1	
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	9940		5970		9370		4150	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	81.4		20.3		22.8		6.8	
ARSENIC	7.2		6.4		4.6		21.6	34.2		11.1		15.7		11.9	
BARIUM	218		158		129		654	377		287		1280		563	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	2.3		0.9		0.7		1.5	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	0.2	J	1.3		0.7	U	0.6	U
CALCIUM	959		991		5580	J	16740	9060		30100		2870		1830	
CHROMIUM	8.9		8.6		8.8		26.7	19.4		12.4		13.3		17.0	
COBALT	6.6		6.2		3.8	J	19.8	9.0		6.2		8.3		6.2	
COPPER	12		12		14.8		44.4	780		289		443		110	
IRON	13200		12000		9340		39600	49800		18200		16000		75700	
LEAD	35		35		43.4	J	130.2	5130		1070		825		314	
MAGNESIUM	733		745		2130	J	6390	766		11700		1340		289	J
MANGANESE	1420	J	1390	J	344		4260	244	J	556	J	743	J	80	J
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	0.2		0.4		0.1		0.6	
NICKEL	6.5		6.2		8.9		26.7	58.9		36.1		38.6		21.4	
POTASSIUM	389	UJ	420	UJ	440	J	1320	804		638		564	J	2700	
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	6.7		3.1	J	2.1	J	10.9	
SILVER	1.1	U	0.99	U	1.2	U	3.6	1.3	U	1.1	U	1.4	U	1.1	U
SODIUM	105	UJ	125	UJ	111	UJ	375	978		315	UJ	151	UJ	1740	
THALLIUM	2.8	U	2.5	U	3	U	8.4	3.2	U	2.8	U	3.4	U	4.1	
VANADIUM	28.5		24.9		20.4		85.5	41.3		21.2		27.6		46.1	
ZINC	92		100		138		414	6140		2330		1920		247	
CYANIDE	3.1	U	3.2		3.2	U	9.6	3.0	U	3.2		3.3	U	3.4	

Table 2
Soil Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9		3 times background	ME00T8		ME00T9		ME00W0		ME00W1	
Sampling Location :	X119		X120		X126			X105		X106		X107		X108	
Matrix :	Soil		Soil		Soil			Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg			mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/21/2009		10/21/2009		10/21/2009		10/21/2009	
Time Sampled :			dup of X119												
%Solids :	75.3		75.5		76.4		65.1		72.7		76.6		76.6		
Dilution Factor :	1		1		1		1		1		1		1		
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	8020		9200		7920		7590	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	13.8		6.0	J	4.4	J	18.6	
ARSENIC	7.2		6.4		4.6		21.6	9.1		12.6		9.0		17.2	
BARIUM	218		158		129		654	239		826		486		243	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	1.0		1.8		2.2		0.9	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	0.9		1.2		0.7	U	0.4	J
CALCIUM	959		991		5580	J	16740	8030		6100		7330		7590	
CHROMIUM	8.9		8.6		8.8		26.7	15.8		25.8		15.7		25.2	
COBALT	6.6		6.2		3.8	J	19.8	7.2		9.1		5.9	J	7.4	
COPPER	12		12		14.8		44.4	261		147		92		319	
IRON	13200		12000		9340		39600	22900		41900		40700		27000	
LEAD	35		35		43.4	J	130.2	853		1140		163		1060	
MAGNESIUM	733		745		2130	J	6390	971		938		504	J	1330	
MANGANESE	1420	J	1390	J	344		4260	403	J	634	J	168	J	765	J
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	0.2		2.3		0.2		0.3	
NICKEL	6.5		6.2		8.9		26.7	40.5		27.2		18.5		39.7	
POTASSIUM	389	UJ	420	UJ	440	J	1320	1050		1170		1320		1180	
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	3.4	J	6.1		6.5		3.9	J
SILVER	1.1	U	0.99	U	1.2	U	3.6	1.3	U	1.2	U	1.3	U	1.2	U
SODIUM	105	UJ	125	UJ	111	UJ	375	298	J	494	J	932		256	J
THALLIUM	2.8	U	2.5	U	3	U	8.4	3.2	U	2.9	U	0.4	J	3.1	U
VANADIUM	28.5		24.9		20.4		85.5	33.2		39.0		47.1		29.0	
ZINC	92		100		138		414	2680		1260		314		7040	
CYANIDE	3.1	U	3.2		3.2	U	9.6	3.8	U	0.5		3.3	U	3.1	

Table 2
Soil Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9		3 times background	ME00W2		ME00W3		ME00W4		ME00W5	
Sampling Location :	X119		X120		X126			X109		X110		X111		X112	
Matrix :	Soil		Soil		Soil			Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg			mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/21/2009		10/21/2009		10/21/2009		10/21/2009	
Time Sampled :			dup of X119												
%Solids :	75.3		75.5		76.4			75.3	0.0	77.4		77.4		74.0	
Dilution Factor :	1		1		1			1	0	1		1		1	
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	7870		8140		6050		7920	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	10.2		8		6.6		74.4	
ARSENIC	7.2		6.4		4.6		21.6	10.5		7.3		8.2		16.5	
BARIUM	218		158		129		654	164		169		118		314	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	0.7		0.62		0.41	J	0.92	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	0.4	J	0.41	J	0.49	U	1.6	
CALCIUM	959		991		5580	J	16740	5130		4380		2190		9180	
CHROMIUM	8.9		8.6		8.8		26.7	10.8		11.8		9.6		15.1	
COBALT	6.6		6.2		3.8	J	19.8	5.2		5	J	4.7	J	7.8	
COPPER	12		12		14.8		44.4	90		144		95		1850	
IRON	13200		12000		9340		39600	12700		13100		12000		23200	
LEAD	35		35		43.4	J	130.2	493		400		284		1970	
MAGNESIUM	733		745		2130	J	6390	1530		955		662		1190	
MANGANESE	1420	J	1390	J	344		4260	491	J	541	J	741	J	740	J
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	0.2		0.16		0.19		0.16	
NICKEL	6.5		6.2		8.9		26.7	16.1		25.8		20.7		120	
POTASSIUM	389	UJ	420	UJ	440	J	1320	455	UJ	384	UJ	368	UJ	613	
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	1.8	J	2	J	1.8	J	3.1	J
SILVER	1.1	U	0.99	U	1.2	U	3.6	1.0	U	1	U	0.98	U	1	U
SODIUM	105	UJ	125	UJ	111	UJ	375	127	UJ	142	UJ	117	UJ	278	UJ
THALLIUM	2.8	U	2.5	U	3	U	8.4	2.6	U	2.6	U	2.4	U	2.6	U
VANADIUM	28.5		24.9		20.4		85.5	22.5		23.4		22.5		30.6	
ZINC	92		100		138		414	1800		956		899		4280	
CYANIDE	3.1	U	3.2		3.2	U	9.6	3.3	U	3.1	U	3		3.2	

Table 2
Soil Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9		3 times background	ME00W6		ME00W7		ME00W8		ME00W9	
Sampling Location :	X119		X120		X126			X113		X114		X115		X116	
Matrix :	Soil		Soil		Soil			Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg			mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/21/2009		10/21/2009		10/21/2009		10/21/2009	
Time Sampled :			dup of X119												
%Solids :	75.3		75.5		76.4			73.1		75.0		76.4		77.2	
Dilution Factor :	1		1		1			1		1		1		1	
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	7660		7990		5810		5300	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	4.1	J	5.6	U	6.9	J	3.4	J
ARSENIC	7.2		6.4		4.6		21.6	7.4		4.8		7.2		7.2	
BARIUM	218		158		129		654	341		102		549		143	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	2.1		0.5		0.41	J	0.67	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	0.55	U	0.47	U	0.65	U	0.51	U
CALCIUM	959		991		5580	J	16740	4870		1140		1900		1420	
CHROMIUM	8.9		8.6		8.8		26.7	14.7		9.9		8.3		9.4	
COBALT	6.6		6.2		3.8	J	19.8	8.6		3.7	J	14.8		3.6	J
COPPER	12		12		14.8		44.4	66		11		96		47	
IRON	13200		12000		9340		39600	35100		10600		11600		14400	
LEAD	35		35		43.4	J	130.2	202		20		402		333	
MAGNESIUM	733		745		2130	J	6390	526	J	763		634	J	517	
MANGANESE	1420	J	1390	J	344		4260	494	J	334	J	3760	J	494	J
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	1		0.09	UJ	0.063		0.091	UJ
NICKEL	6.5		6.2		8.9		26.7	22.9		5.7		9.1		7.2	
POTASSIUM	389	UJ	420	UJ	440	J	1320	1010		502		352	UJ	265	UJ
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	4.8		1.6	J	1.9	J	2.1	J
SILVER	1.1	U	0.99	U	1.2	U	3.6	1.1	U	0.94	U	1.3	U	1	U
SODIUM	105	UJ	125	UJ	111	UJ	375	795		100	UJ	178	UJ	113	UJ
THALLIUM	2.8	U	2.5	U	3	U	8.4	2.8	U	2.3	U	3.3	U	2.6	U
VANADIUM	28.5		24.9		20.4		85.5	42.9		22		28.1		25.5	
ZINC	92		100		138		414	783		62		383		346	
CYANIDE	3.1	U	3.2		3.2	U	9.6	0.089	J	3.1		3.1	U	3	

Table 2
Soil Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9		3 times background	ME00X0		ME00X1		ME00X4		ME00X5	
Sampling Location :	X119		X120		X126			X117		X118		X121		X122	
Matrix :	Soil		Soil		Soil			Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg			mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/21/2009		10/21/2009		10/21/2009		10/21/2009	
Time Sampled :			dup of X119												
%Solids :	75.3		75.5		76.4		79.6		74.1		81.7		0	74.4	0
Dilution Factor :	1		1		1		1		1		1		0	1	0
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	6720		8460		7140		6820	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	125		914		2.3	J	15.5	J
ARSENIC	7.2		6.4		4.6		21.6	30		181		6.4		16.7	
BARIUM	218		158		129		654	265		293		102		265	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	1		1.6		0.6	J	0.99	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	3.2		2.7		0.61	U	1.2	
CALCIUM	959		991		5580	J	16740	2070		4620		43900	J	111000	J
CHROMIUM	8.9		8.6		8.8		26.7	9.9		14.9		10.6		17.6	
COBALT	6.6		6.2		3.8	J	19.8	7.2		14.8		5.5	J	5.9	
COPPER	12		12		14.8		44.4	7890		12800		65.2		275	
IRON	13200		12000		9340		39600	21800		103000		13000		21100	
LEAD	35		35		43.4	J	130.2	5000		49900		103	J	820	J
MAGNESIUM	733		745		2130	J	6390	686		385	J	2940	J	4250	J
MANGANESE	1420	J	1390	J	344		4260	852	J	805	J	750		322	
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	1		0.26		0.13		0.7	
NICKEL	6.5		6.2		8.9		26.7	46.7		97.4		53.3		48.2	
POTASSIUM	389	UJ	420	UJ	440	J	1320	704		338	UJ	524	J	534	
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	3.4		9.9		1.8	J	2.8	J
SILVER	1.1	U	0.99	U	1.2	U	3.6	1.3		8.9		1.2	U	1	U
SODIUM	105	UJ	125	UJ	111	UJ	375	234	UJ	538		112	UJ	442	UJ
THALLIUM	2.8	U	2.5	U	3	U	8.4	2.4	U	2.4	U	3.1	U	2.5	U
VANADIUM	28.5		24.9		20.4		85.5	26.9		27.5		18.3		20.3	
ZINC	92		100		138		414	9260		37500		1030		2940	
CYANIDE	3.1	U	3.2		3.2	U	9.6	0.17	J	3.1		3.1	U	0.16	J

Table 2
Soil Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9		3 times background	ME00X6		ME00X7		ME00X8		ME00Y0	
Sampling Location :	X119		X120		X126			X123		X124		X125		X127	
Matrix :	Soil		Soil		Soil			Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg			mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/21/2009		10/22/2009		10/22/2009		10/22/2009	
Time Sampled :			dup of X119					dup of X122							
%Solids :	75.3		75.5		76.4			77.3	0	75	0	56		79.8	
Dilution Factor :	1		1		1			1	0	1	0	1		1	
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	7240		9410		9580		8650	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	20.3	J	200	J	6.5	J	1.6	J
ARSENIC	7.2		6.4		4.6		21.6	21.9		23.3		8.7		9.7	
BARIUM	218		158		129		654	322		232		459		181	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	0.94		1.7		1.4		0.84	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	2.5		8.9		2.1		0.59	U
CALCIUM	959		991		5580	J	16740	41700	J	4270	J	21000	J	2740	J
CHROMIUM	8.9		8.6		8.8		26.7	26.5		27.7		23		14.8	
COBALT	6.6		6.2		3.8	J	19.8	7.1		28.2		6.6	J	7.3	
COPPER	12		12		14.8		44.4	386		5470		158		39.4	
IRON	13200		12000		9340		39600	25300		29100		20600		22900	
LEAD	35		35		43.4	J	130.2	1010	J	11800	J	1400	J	87.7	J
MAGNESIUM	733		745		2130	J	6390	6660	J	891	J	2790	J	1530	J
MANGANESE	1420	J	1390	J	344		4260	380		548		623		589	
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	0.74		0.16		0.84		0.078	UJ
NICKEL	6.5		6.2		8.9		26.7	62		1550		25.7		18.6	
POTASSIUM	389	UJ	420	UJ	440	J	1320	556		613		1470		748	
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	3.5		4.2		4	J	3.3	J
SILVER	1.1	U	0.99	U	1.2	U	3.6	0.9	U	4.7	J+	1.6	U	1.2	U
SODIUM	105	UJ	125	UJ	111	UJ	375	396	UJ	466	UJ	561	UJ	242	UJ
THALLIUM	2.8	U	2.5	U	3	U	8.4	2.3	U	2.7	U	3.9	U	3	U
VANADIUM	28.5		24.9		20.4		85.5	22.8		16.7		40.2		26	
ZINC	92		100		138		414	3640		107000		1710		354	
CYANIDE	3.1	U	3.2		3.2	U	9.6	0.083	J	3.2	U	4.4	U	3	U

Table 3
Waste Sample Results

Sample Number :	ME00X2		ME00X3		ME00X9		3 times background	ME00R6		ME00R7		ME00R8		ME00R9	
Sampling Location :	X119		X120		X126			X301		X302		X303		X304	
Matrix :	Soil		Soil		Soil			Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		mg/Kg			mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/21/2009		10/21/2009		10/22/2009			10/19/2009		10/19/2009		10/19/2009		10/19/2009	
Time Sampled :			dup of X119												
%Solids :	75.3		75.5		76.4			75.8		62.5		76.5		81.8	
Dilution Factor :	1		1		1		1		1		1		1		
ANALYTE	Result	Flag	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	7460		7410		6510		22380	13400		5200		7790		6410	
ANTIMONY	1.1	J	1.1	J	7.1	UJ	21.3	212	J	98.8	J	195	J	57.6	J
ARSENIC	7.2		6.4		4.6		21.6	70.3		55.2		26.3		61.4	
BARIUM	218		158		129		654	732		115		108		278	
BERYLLIUM	0.51	J	0.49		0.58	J	1.74	1		0.53	J	0.99		0.99	
CADMIUM	0.56	U	0.49	U	0.6	U	1.8	64.8	J	16.9	J	23.8	J	29.9	J
CALCIUM	959		991		5580	J	16740	13600		859		2480		5920	
CHROMIUM	8.9		8.6		8.8		26.7	128		21.9		40.8		157	
COBALT	6.6		6.2		3.8	J	19.8	15.5		7.1		19.6		11.9	
COPPER	12		12		14.8		44.4	3640		2240		1720		536	
IRON	13200		12000		9340		39600	42600		23400		31300		114000	
LEAD	35		35		43.4	J	130.2	12400		37600		1950		2140	
MAGNESIUM	733		745		2130	J	6390	2430		468	J	627		2030	
MANGANESE	1420	J	1390	J	344		4260	913	J	294	J	372	J	1940	J
MERCURY	0.078	UJ	0.091	UJ	0.1	J	0.3	4		2.3		0.18		1	
NICKEL	6.5		6.2		8.9		26.7	667		491		1770		193	
POTASSIUM	389	UJ	420	UJ	440	J	1320	785		190	J	539		204	J
SELENIUM	1.8	J	1.7	J	1.5	J	5.4	6.8		8.4		5.4		16.2	
SILVER	1.1	U	0.99	U	1.2	U	3.6	4.3	J+	6.6	J+	0.49	J+	0.96	U
SODIUM	105	UJ	125	UJ	111	UJ	375	1130	J	202	UJ	289	UJ	313	UJ
THALLIUM	2.8	U	2.5	U	3	U	8.4	2.7	U	3.3	U	2.6	U	2.4	U
VANADIUM	28.5		24.9		20.4		85.5	41.7		22.9		26.6		25.9	
ZINC	92		100		138		414	205000		277000		31000		204000	
CYANIDE	3.1	U	3.2		3.2	U	9.6	3.2	U	3.8	U	3.2	U	0.96	J

Table 4
Sediment Sample Results

Sample Number :	ME00T1		ME00T8			ME00R4		ME00R5		ME00S0		ME00S1		ME00S2	
Sampling Location :	X214		X215			X201		X202		X203		X204		X205	
Matrix :	Soil		Soil			Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		3 times	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/20/2009		10/20/2009		background	10/19/2009		10/19/2009		10/20/2009		10/20/2009		10/20/2009	
Time Sampled :	background		background		using the										
%Solids :	72		65.4		higher of the	59.3		71.2		71.9		77.4		77.7	
Dilution Factor :	1		1		2 values	1		1		1		1		1	
ANALYTE	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	9350		10500		31500	11900		10700		8700		7060		7120	
ANTIMONY	2.1	J	1.9	J	6.3	11.7	J	20.6	J	41.8	J	44	J	39.9	J
ARSENIC	6.9		5.1		20.7	16.9		75.3		27.8		15.5		19.3	
BARIUM	131		120		393	195		215		327		194		158	
BERYLLIUM	0.64		0.71		2.13	0.83		1.1		0.8		0.6		0.72	
CADMIUM	0.63	UJ	0.64	UJ	1.92	26.7	J	22.4	J	23.2	J	9.5	J	10.6	J
CALCIUM	2350		2650		7950	2800		2030		1930		1290		1340	
CHROMIUM	12.6		12.9		38.7	16.6		23.4		17.2		14.4		17.4	
COBALT	7.5		3.4	J	22.5	9.6		13		18		10.3		10.6	
COPPER	31		32.4		97.2	270		297		1950		1130		1260	
IRON	16400		15800		49200	20000		34600		25200		17500		21900	
LEAD	63.4		90		270	625		1580		2460		1230		1380	
MAGNESIUM	1050		1140		3420	1290		1080		970		769		764	
MANGANESE	689	J	202	J	2067	783	J	1510	J	2160	J	1160	J	1070	J
MERCURY	0.031	J	0.15	U	0.45	0.035	J	0.11	J	0.33		0.17		0.21	
NICKEL	17.2		12.1		51.6	58.3		84		122		92.6		88.9	
POTASSIUM	698		888		2664	905		640		526	J	366	J	338	J
SELENIUM	2.4	J	2.7	J	8.1	3.4	J	5.5		3.5	J	2.9	J	3.1	
SILVER	1.3	U	1.3	U	3.9	1.1	U	0.99	U	1.4	U	1.1	U	0.88	U
SODIUM	153	UJ	136	UJ	459	159	UJ	153	UJ	279	UJ	193	UJ	218	UJ
THALLIUM	3.2	U	3.2	U	9.6	2.8	U	2.5	U	3.5	U	2.8	U	2.2	U
VANADIUM	28.8		26.1		86.4	45		72.7		46.2		36.4		42.4	
ZINC	483		332		1449	4340		5740		5430		4410		4960	
CYANIDE	3.2	U	3.6	U	10.8	4.1	U	3.3	U	3.5	U	3	U	3.2	U

Table 4
Sediment Sample Results

Sample Number :	ME00T1		ME00T6			ME00S3		ME00S4		ME00S5		ME00S6		ME00S7		ME00S8		ME00S9		ME00T0	
Sampling Location :	X214		X215			X206		X207		X208		X209		X210		X211		X212		X213	
Matrix :	Soil		Soil			Soil		Soil		Soil		Soil		Soil		Soil		Soil		Soil	
Units :	mg/Kg		mg/Kg		3 times	mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg		mg/Kg	
Date Sampled :	10/20/2009		10/20/2009		background	10/20/2009		10/20/2009		10/20/2009		10/20/2009		10/20/2009		10/20/2009		10/20/2009		10/20/2009	
Time Sampled :	background		background		using the																
%Solids :	72		65.4		higher of the	71.6		72.3		72.2		79.7		66.8		74.5		75.7		71.3	
Dilution Factor :	1		1		2 values	1		1		1		1		1		1		1		1	
ANALYTE	Result	Flag	Result	Flag		Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag	Result	Flag
ALUMINUM	9350		10500		31500	13700		7080		9700		7750		8610		9180		10000		9310	
ANTIMONY	2.1	J	1.9	J	6.3	9.5	J	17.7	J	50.3	J	99.7	J	37.6	J	74.4	J	24.1	J	13.6	J
ARSENIC	6.9		5.1		20.7	6.4		7.4		30.2		17.8		9		17.5		15.5		39	
BARIUM	131		120		393	129		144		425		121		126		162		125		782	
BERYLLIUM	0.64		0.71		2.13	0.69		0.44	J	1.2		0.63		0.58	J	0.69		0.56	J	1.1	
CADMIUM	0.63	UJ	0.64	UJ	1.92	45.3	J	6.6	J	23.1	J	5.8	J	4.6	J	10	J	8.2	J	15.3	J
CALCIUM	2350		2650		7950	2460		1830		2590		1250		1570		1860		1980		3050	
CHROMIUM	12.6		12.9		38.7	16.3		9.4		22.7		13		13.8		40.2		14.7		18.7	
COBALT	7.5		3.4	J	22.5	5.4	J	3.2	J	27.2		7.8		6.7		11.6		4.6	J	24.7	
COPPER	31		32.4		97.2	352		1520		1410		1700		1580		3280		577		230	
IRON	16400		15800		49200	12600		10300		38900		18100		11800		22300		13600		48100	
LEAD	63.4		90		270	851		1560		2630		1690		1570		2010		1220		1070	
MAGNESIUM	1050		1140		3420	1480		859		1020		822		821		837		1360		952	
MANGANESE	689	J	202	J	2067	257	J	230	J	3550	J	759	J	378	J	528	J	204	J	7800	J
MERCURY	0.031	J	0.15	U	0.45	0.15		0.28		0.32		0.2		0.28		0.29		0.13	U	0.046	J
NICKEL	17.2		12.1		51.6	113		42.1		188		51.3		104		1200		194		95.6	
POTASSIUM	698		888		2664	1010		458	J	607	J	399	J	530	J	371	J	512	J	420	J
SELENIUM	2.4	J	2.7	J	8.1	2.4	J	1.8	J	5.9		2.7	J	2.3	J	3.3	J	2.1	J	6.1	
SILVER	1.3	U	1.3	U	3.9	1.1	U	0.18	J+	1.3	U	0.46	J+	1.3	U	0.9	J+	0.31	J+	1.1	U
SODIUM	153	UJ	136	UJ	459	154	UJ	210	UJ	321	UJ	189	UJ	169	UJ	331	UJ	185	UJ	223	UJ
THALLIUM	3.2	U	3.2	U	9.6	2.8	U	3	U	3.3	U	2.6	U	3.2	U	2.6	U	3	U	2.7	U
VANADIUM	28.8		26.1		86.4	26.7		19.2		70.5		36.9		27.6		34.3		23.1		48	
ZINC	483		332		1449	10500		3980		9420		3620		3850		22700		11800		9460	
CYANIDE	3.2	U	3.6	U	10.8	3.4	U	3.4	U	3.4	U	3.1	U	3.8	U	3.2	U	3.1	U	3.5	U

Appendix C

Sample Photos

SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1300
PHOTO BY: L. Range
DIRECTION: West

COMMENTS:

Picture taken of the drainage of water from the site to the southwest corner of the site.



DATE: 10/19/2009
TIME: 1300
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

Picture taken of the surface water draining south off of the site.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1330
PHOTO BY: L. Range
DIRECTION: Southwest

COMMENTS:

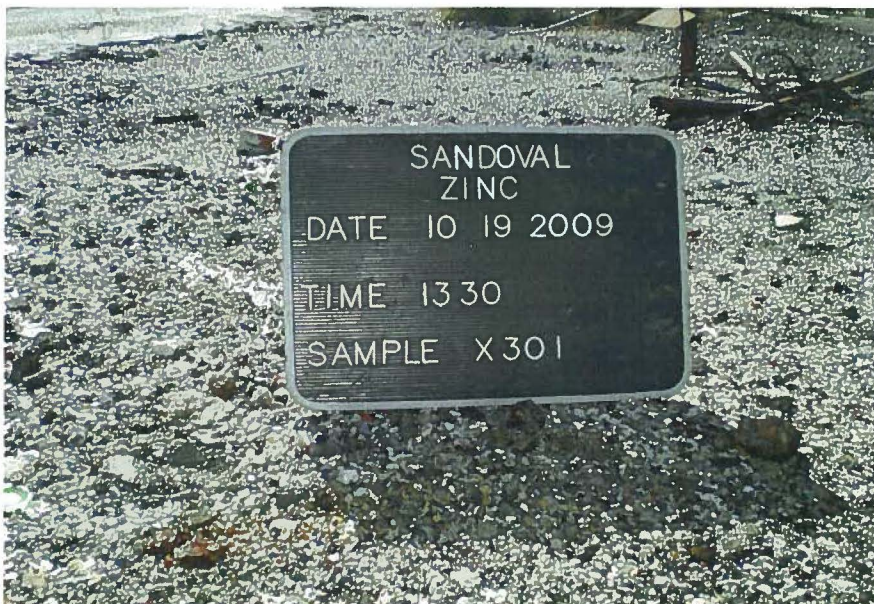
Picture is taken to the southwest of sample X301. This is near the southwest corner of the Sandoval Zinc property. Sample was taken from a depth of 0-2 inches from a light gray material with rocks and gray sand.



DATE: 10/19/2009
TIME: 1330
PHOTO BY: L. Range
DIRECTION: Southwest

COMMENTS:

Picture is taken to the southwest of sample X301. This is near the southwest corner of the Sandoval Zinc property. Sample was taken from a depth of 0-2 inches from a light gray material with rocks and gray sand.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1345
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

Picture was taken to identify human trespassing at the site. Photo depicts four-wheeler tracks at the site in a radial pattern indicating that donuts were being conducted at the site and in all probability stirring up contaminated dust.



DATE: 10/19/2009
TIME: 1345
PHOTO BY: L. Range
DIRECTION: West

COMMENTS:

Picture taken of vehicle tracks through the property. Evidence of trespassing activity.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1400
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

Photo taken of Samples X302 and T101. These samples were collected from 0-2 inches and consisted of a dark gray sandy silt material.



DATE: 10/19/2009
TIME: 1410
PHOTO BY: L. Range
DIRECTION: West

COMMENTS:

Photo taken of the drainage pathway from the site draining to the east towards the fence and wetlands.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1410
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

This photo was taken to continue the drainage pathway from the site towards the wetlands and pond located east of the fenced portion of the site.



DATE: 10/19/2009
TIME: 1430
PHOTO BY: L. Range
DIRECTION: South

COMMENTS:

This photo was taken of sample X303 near the northeast corner of the fenced portion of the property. Sample was collected from a depth of 0-2 inches from a black cinder material. Notice the remnants of the furnace in the background.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1440
PHOTO BY: L. Range
DIRECTION: West

COMMENTS:

This photo was taken of the surface water drainage from the north side of the site which flows east along the railroad tracks to the wetlands located at the east end of the fenced property.



DATE: 10/19/2009
TIME: 1440
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

This photo is a continuation of the surface water drainage from the north side of the site. This photo depicts the water from the site flowing to the wetlands located east of the fenced portion of the property.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1445
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

This photo was taken of sample X304. This sample was collected from the northwest corner of the fenced property from a depth of 0-2 inches from a reddish brown sandy material.



DATE: 10/19/2009
TIME: 1500
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

Photo was taken to the north of T102. T102 was collected from a black cindery material from 0-2 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/19/2009
TIME: 1530
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

This photo was taken of sample location X202. X202 was collected from a low lying area in which drainage from wetlands was present. X202 was collected from a depth of 8 inches from a brown silty sediment.



DATE: 10/19/2009
TIME: 1600
PHOTO BY: L. Range
DIRECTION: South

COMMENTS:

Photo taken at 1600 of sample X201. X201 was collected at the confluence of one of the surface water pathways as it enters into Prairie Creek. X201 was collected from a brown silt from a depth of 0-3 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 0900
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

Photo taken of sample location X203. Phragmites present everywhere. Sample was collected from the deepest area of the drainage area in the wetland. X203 consisted of a slightly gritty slightly sandy clay. Sample was collected from a depth of 8 inches.



DATE: 10/20/2009
TIME: 0930
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

Photo taken of Sample X204 and X205 duplicate. Sample location was within the wetlands. Sample was collected from lowest portion of the wetlands in this area. Sample was collected from a depth of 12 to 16 inches from a light brown sandy silt with some clay.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1000
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

Photo was taken of sample location X206. X206 was collected from the wetland area. X206 consisted of a brown silt with some grit from a depth of 8-10 inches. This location is near the four wheeler crossing southeast of the site.



DATE: 10/20/2009
TIME: 1030
PHOTO BY: L. Range
DIRECTION: Southeast

COMMENTS:

Photo was taken of sample location X207. X207 was collected from a lowlying area within the wetlands. This location was at the east side of the four wheeler path. X207 was collected from a brown silt with some clay and grit from a depth of 6 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1100
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:
 Photo taken of sample location X208 from the wetland area. X208 consisted of a silty sand with many roots from the phragmites from a depth of 8 inches.



DATE: 10/20/2009
TIME: 1145
PHOTO BY: L. Range
DIRECTION: Northeast

COMMENTS:
 Photo taken of sample location X209. X209 was collected from low lying wetlands. X209 consisted of a brown gritty silt from a depth of 10-12 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1200
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

Photo documentation of fishing that has occurred at the pond located east of the site. Notice the pole holder (red in color) which was found along the bank of the pond. This evidence suggests that residents in the area are utilizing the pond for fishing purposes.



DATE: 10/20/2009
TIME: 1200
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

Photo documentation of fishing that has occurred at the pond located east of the site. Notice the pole holder (red in color) which was found along the bank of the pond. This evidence suggests that residents in the area are utilizing the pond for fishing purposes.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1245
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

Photo taken of sample location X211. X211 was located at the confluence of drainage from the site to the wetlands located along the eastern edge of the property. X211 consisted of a brown silt with cinders. Collected from a depth of 0-3 inches.



DATE: 10/20/2009
TIME: 1245
PHOTO BY: L. Range
DIRECTION: West

COMMENTS:

Photo taken of sample location X211. X211 was located at the confluence of drainage from the site to the wetlands located along the eastern edge of the property. X211 consisted of a brown silt with cinders. Collected from a depth of 0-3 inches. Showing drainage from site.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1300
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

Photo taken of sample location X212. X212 was located in the area of confluence of the drainage from the north side of the property to the wetland area. X212 consisted of a gritty brown silt and was collected from a depth of 0-3 inches.



DATE: 10/20/2009
TIME: 1300
PHOTO BY: L. Range
DIRECTION: West

COMMENTS:

Photo taken of sample location X212. X212 was located in the area of confluence of the drainage from the north side of the property to the wetland area. X212 consisted of a gritty brown silt and was collected from a depth of 0-3 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1315
PHOTO BY: L. Range
DIRECTION: Southeast

COMMENTS:

Photo taken of sample location X213. X213 was located on the north side of the tracks from an area which was discharging surface water from the west towards the drainage pipes which pass under the RR tracks. X213 consisted of a light brown silt collected from 0-3 inches.



DATE: 10/20/2009
TIME: 1330
PHOTO BY: L. Range
DIRECTION: South

COMMENTS:

Photo taken of sample location X214. X214 was located from a wooded area located upstream from the site. Sample consisted of a brown silt. Sample was collected from a depth of 0-2 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1345
PHOTO BY: L. Range
DIRECTION: Southwest

COMMENTS:

Photo taken of sample location X215. X215 was located upstream of the site in a wooded area. X215 consisted of a brown silt collected from a depth of 0-3 inches.



DATE: 10/20/2009
TIME: 1530
PHOTO BY: L. Range
DIRECTION: Northeast

COMMENTS:

This photo was taken of sample location X101. This sample was collected from a residential yard. X101 was located at the southwest corner of the property from a black cindery material from a depth of 4 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1600
PHOTO BY: L. Range
DIRECTION: Northeast

COMMENTS:
 Photo was taken of sample location X102. X102 was located at the southwest corner of the home. Sample consisted of a sandy brown loam and was collected from a depth of 4 inches.



DATE: 10/20/2009
TIME: 1700
PHOTO BY: L. Range
DIRECTION: South

COMMENTS:
 Photo taken of sample X103. This sample was located in the former football field located to the north of the Jr/Sr High School. X103 was collected from a depth of 4 inches from a brown loam, which was just under a peat type layer.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/20/2009
TIME: 1730
PHOTO BY: L. Range
DIRECTION: Southeast

COMMENTS:

Sample X104 was collected in the play area of the Sandoval elementary school. This play area is located to the south of the school. X104 was collected from a depth of 6 inches from a brown loam with fill material and debris.



DATE: 10/21/2009
TIME: 0930
PHOTO BY: L. Range
DIRECTION: Southwest

COMMENTS:

Photo taken of sample location X105. X105 was located at the corner of a residential area just northeast of the watertower. X105 was collected from a brown silty loam interspersed with gravelly fill material from a depth of 6 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE:	10/21/09
TIME:	1000
PHOTO BY:	L. Range
DIRECTION:	East
COMMENTS:	<p>This location is near Perry and Broadway. X106 was collected from the southwest corner of the property. Sample consisted of a dark brown silty loam from a depth of 6 inches.</p>



DATE:	10/21/2009
TIME:	1030
PHOTO BY:	L. Range
DIRECTION:	North
COMMENTS:	<p>This sample location was taken from the western portion of public housing near Oak Street. This sample consisted of a brown cindery mix from a depth of 6 inches.</p>



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/21/2009
TIME: 1100
PHOTO BY: L. Range
DIRECTION: Northeast

COMMENTS:

This photow was taken of Sample X108 which was located on the southwest corner of the property (Mulberry Street). X108 was collected from a depth of 6 inches from a brown cindery loam.



DATE: 10/21/2009
TIME: 1130
PHOTO BY: L. Range
DIRECTION: Northwest

COMMENTS:

This sample was located on the northeast corner of the public housing located on Mulberry Street. X109 was collected from a depth of 6 inches from a light brown silty loam.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE:	10/21/09
TIME:	1245
PHOTO BY:	L. Range
DIRECTION:	West
COMMENTS:	X110 was collected from a residence located along Mulberry Street from the front yard. X110 consisted of a brown silty loam from a depth of 4 to 6 inches.



DATE:	10/21/2009
TIME:	1315
PHOTO BY:	L. Range
DIRECTION:	South
COMMENTS:	Photo was taken of sample X111. This sample was collected from the public park. X111 consisted of a brown silty loam from a depth of 4 to 6 inches.



SITE NAME:	Sandoval Zinc		
CERCLIS ID:	ILD 053 980 454	COUNTY:	Marion

DATE: 10/21/2009
TIME: 1345
PHOTO BY: L. Range
DIRECTION: East

COMMENTS:

X112 was collected from a residential property located along Mulberry Street. X112 consisted of a brown silty loam with cinders from a depth of 4 inches. This sample was collected from the front yard.



DATE: 10/21/2009
TIME: 1415
PHOTO BY: L. Range
DIRECTION: North

COMMENTS:

Photo was taken of sample X113. X113 was collected from a residential yard located on Arizona Street. X113 consisted of a brown silty clay with cinders from a depth of 6 inches.



